

## PROCESS CLAIMS

1. A process for the removal of heavy metals like arsenic, chromium, etc. from water to be used for human drinking purposes, comprising an undivided electrolytic cell through which the contaminated water is continuously circulated, said cell comprising at least one anode and one cathode,
  - said anode made of iron, or iron alloy, or steel,
  - said cathode made of iron, or iron alloy, or steel, or titanium, or titanium coated with high hydrogen overpotential oxides, like platinum or rubidium,
  - said anode and cathode being placed at close distance to each other,
  - means for insufflating a gas containing oxygen, or air, between or through said anode and cathode.
2. Process according to claim 1 wherein the water to be treated is continuously recirculated through said electrolytic cell.
3. Process according to claim 1 wherein the water recirculated through said cell passes through a temporary storage tank in order to increase the permanence time in said electrolytic cell.
4. Process according to claim 1 wherein a constant direct current is passed through said electrolytic cell, the intensity of said current being between 1 and 10 mA per cmsq of said anode and cathode.
5. Process according to claim 1 wherein said iron, or iron alloy, anode is dissolved during electrolysis to ferrous hydroxide and immediately oxidised to ferric hydroxide under the action of said insufflated gas containing oxygen, said ferric hydroxide being insoluble in water.
6. Process according to claim 1 wherein low oxidation order species, as As(+3), are oxidised to higher order, as As(+5), under the action of both the insufflated gas containing oxygen, and the oxidising products generated at the cathode in presence of ferrous ions, Fe(+2).
7. Process according to claim 1 wherein the higher order oxidised species, as As(+5), are sorbed to said insoluble iron hydroxides, which are successively filtered out, leaving the purified water, free from contaminants.

## APPARATUS CLAIMS

1. Apparatus for the removal of heavy metals like arsenic, chromium, etc. from water, comprising: an electrolytic cell having a plurality of electrodes made of iron, or iron alloy, or steel, said cell having an inlet connector for the water to be treated and an outlet connector for the treated water; means for circulating the water through said electrolytic cell; means for insufflating a gas containing oxygen into said electrolytic cell.
2. Apparatus according to claim 1 wherein said electrolytic cell is composed by a cylindrical housing, vertically positioned, lined inside with a layer of insulating material.
3. Apparatus according to claim 1 wherein internally to said housing a plurality of circular plates made of iron, or steel, or iron alloy are stacked along the axis of said of said housing, said plates being spaced by means of electrically insulating spacers, the first and last plates, on top and bottom of the stack being electrically connected to two terminals that are connected to an electrical power supply which delivers a constant d.c. current to the electrode stack.
4. Apparatus according to claim 1 wherein said means for insufflating said gas are fitted on the bottom of said housing and placed under the first bottom electrode plate.
5. Apparatus according to claim 1 wherein said water inlet and outlet are placed respectively under and on top of the electrode plate stack.
6. Apparatus according to claim 3 wherein each one of said plates is in contact at its rim with the inner wall of said housing, each plate being pierced with a plurality of holes.
7. Apparatus according to claim 3 wherein said plates are stacked coaxially to a tube, placed on the centre of said housing, that holds the whole stack, at the bottom end of said tube being fitted said means for the insufflation of said gas containing oxygen, the upper end of said tube extending from the top cover of said housing and being fitted with an inlet connection for the supply of said gas.
8. Apparatus according to the preceding claim wherein the means for the insufflation of said gas include a centre collector connected to the bottom end of said central tube and a plurality of radial tubular branches extending from said centre collector, said branches having holes pierced along their upper part for the delivery of said gas.
9. Apparatus according to claim 2 wherein said housing is equipped on its top cover with a gas exhaust pipe, said gases being generated inside said housing.
10. Apparatus according to claim 1 wherein it is equipped with means for the water recirculation through said electrolytic cell.
11. Apparatus according to claim 1 wherein the water recirculation circuit includes an input pipe in communication with the upper part of said electrodes stack, and an output pipe in communication with the space under said electrodes stack, a pump being installed between the input and output pipes.
12. Apparatus according to the preceding claim wherein in said recirculation circuit a tank is inserted as a temporary storage of the recirculated water.
13. Apparatus according to claim 3 wherein the electrodes stack can be extracted from the housing of said electrolytic cell.
14. Apparatus according to claim 1 wherein it includes means for the settling and filtration of the water flowing out from said cell.